LESLIE-VIBRATONE

INSTRUCTIONS, SERVICE INFORMATION

AND

PARTS LIST

MODEL 31H

ELECTRO-MUSIC ACCESSORIES CO.

Pasadena, California

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INSTALLATION

Attach console cable in usual manner. The remote control tremolo switch and filter assembly should then be installed at console as follows:

1. Attach switch case to wooden rail directly in front of lower manual. Use two of the slotted head or recessed head No. 6 x ½" screws provided. Be sure the flat metal washers are used under screw heads, as breakage of switch case mounting lugs will result if washers are not used. The most convenient location for the organist is usually to the left in front of preset keys.

2. With back of console removed, cut small notch in shelf to allow switch cord to enter interior.

3. Mount filter case at any convenient point close to pre-amplifier. This may be along side or underside of console case top.

4. The three wires from the filter case are connected as follows: remove B+ wire from pre-amplifier terminal; connect this wire to red wire from switch filter and push insulating sleeve over terminal; connect yellow wire to B+ terminal on pre-amplifier; ground black wire to one of the screws on swell box cover (do not connect this wire to ground terminal of pre-amplifier). Both Phillips head and slotted head mounting screws are provided along with staples to secure switch wire under console.

5. Adjust the relay as per instructions on back of upper compartment cover. Relay instructions are also in this booklet under "Relay Adjustment."

THIS SWITCH EQUIPMENT IS PART OF THE SPEAKER VOLTAGE SUPPLY AND CANNOT IMPAIR THE OPERATION OF THE CONSOLE IN ANY WAY. The Leslie-Vibratone may be operated without installing remote control tremolo switch, in which case, the tremolo switch at speaker itself may be used.

Various combinations of tremolo switching may be used by rearranging the motor plugs at the speaker. Motor outlet marked with a red dot is controlled by remote control tremolo switch at console. If switch is not installed at the console, this outlet will remain "on". The other motor outlet is controlled by switch on side of speaker cabinet.

The standard arrangement preferred by most organists is with upper motor plug in red-dot outlet, thereby controlling upper rotor from the console, and lower rotor by switch at side of cabinet. All speakers are shipped from the factory set up for this type of operation. If desirable, other arrangements could be used by rearranging these motor plugs into one or the other motor outlets. Both motors may be controlled by one of the outlets alone by using a regular three-way plug.

RELAY ADJUSTMENT

Due to variations in console pre-amplifiers, the tremolo relay located in speaker amplifier should be adjusted when speaker and remote control tremolo

switch are installed. The adjusting screw will be found in a recessed hole in top of amplifier near fuse cap.

When used with models A, B, C, and D consoles, proceed as follows:

1. With current off, remove upper rotor belt from motor pulley and turn relay adjusting screw to right (clockwise) until end of travel is felt. Do not force screw beyond this point.

2. Turn on console and speaker, and place remote control tremolo switch at console to "off" position.

3. Turn adjusting screw to left (counter-clockwise) slowly until motor stops. Then turn screw one revolution further to left.

This completes the adjustment, and belt may then be placed back on motor pulley, and unit is ready for operation. A slight lag of about one-half second in relay operation is normal.

When used with Model E consoles, proceed as above except turn screw only one-half turn after motor stops (see No. 3 above). Due to wide variations in B+ bleeder current in Model E pre-amplifiers, it is sometimes necessary to place a resistor of about 5000 ohms in series with the yellow lead that is connected to the B+ terminal on the pre-amplifier, in order to insure reliable relay operation.

When used with "V" series consoles (BV, CV, etc.), adjust relay screw as for Model E. In some cases a snap will be heard in the speaker when remote switch is operated. This may be eliminated by connecting a 1 Mfd. paper condenser of four hundred or more volts D.C. rating, directly from pre-amplifier B+ terminal screw to ground terminal screw. An uncased condenser with flexible insulated leads is very satisfactory for this purpose. Condensers of this type are available at radio parts stores.

In case there are wide variations in line voltage, the relay adjustment should be made with line voltage at average value, rather than at either of the extremes of the variations. In addition to the motor circuit control, the relay also has extra contacts which are used as a dummy console B+ load, so that when additional Leslie-Vibratones are connected to a single console, the relays in all of them are operated by the remote switch at the console.

If a satisfactory relay adjustment cannot be made after following above instructions, the pre-amplifier current should be checked, as defective parts in the pre-amplifier will interfere with operation of the relay. Normal current in two-tube pre-amplifiers is around four to five milliamperes. Normal current in five-tube "V" series pre-amplifiers runs about twelve to fourteen milliamperes. Current in excess of these values usually indicates defective parts or tubes in the pre-amplifier, which must be corrected before normal relay operation can be accomplished.

VOLUME CONTROL SETTING

A volume control of the screwdriver adjustment type is provided on top of amplifier near fuse holder, which will allow full power output without distortion with various consoles. In order to set this control properly, proceed

as follows: turn volume control to left as far as it will go (lowest volume); pull all drawbars out to position eight on one of the manuals and pedals; play full chords and pedal note with swell pedal completely open; advance volume control on amplifier until distortion becomes noticeable, then back the control off slightly to eliminate all distortion. This will be the proper setting and need not be further disturbed. Another use of the volume control is to turn down the volume where a maximum limit of loudness is desired. In an installation involving more than one speaker, the volume control is quite an advantage in balancing the sound level between the various speakers. In the case of two speakers, it is desirable to listen to approximately equal amounts of sound from each speaker for richest musical effects. A little experimenting with the balance between speakers is highly recommended.

Caution: Do not adjust volume control beyond the distortion point as continued use under overloaded conditions can cause damage to the speaker units.

USE OF REMOTE TREMOLO SWITCH

If remote tremolo switch is used with standard arrangement of controlling only the upper rotor, separate effects for each manual may be obtained. This is done by choosing a stop with low upper harmonic content for one manual, such as the Tibia, and another stop with rich upper harmonic content for the other manual, such as a string quality. The Tibia may be played in the middle C range and will contain normal tremolo; whereas, if the string quality is played an octave or more above Middle C, it will have a very straight character with little tremolo, with switch in "off" position. Many organists find this to be very useful for certain types of church music.

It is readily seen that solos containing tremolo with straight type accompaniment, or vice-versa, are easily obtained. When the Leslie-Vibratone is used with consoles containing an electronic vibrato attachment, a particularly valuable combination is obtained with the conditions suggested above, plus the console vibrato knob on "No. 1" position.

BROADCASTING AND RECORDING

For full, rich pipe-organ effects, the organ should be played at fairly high sound volume in a reasonably live studio with the microphone placed about ten or more feet away from the speaker at a height of about four feet. When using two or more Vibratones, they should be separated by at least ten or fifteen feet to derive the most benefit from a multiple installation.

When using Leslie-Vibratone tremulants, the use of chorus and tremulant in the console should be avoided as they tend to produce choppy and unmusical effects.

CONNECTING MORE THAN ONE LESLIE-VIBRATONE TO A SINGLE CONSOLE

Results obtained from the use of one Leslie-Vibratone are usually quite satisfactory, but a surprising amount of added grandeur and fullness can be

achieved from the use of two or more units. One speaker might be compared to a pipe organ with one chest of pipes, whereas adding Leslie-Vibratones tends to create the effect of additional chests of pipes. Even though more power is not always desired, two speakers are often employed for the extra musical characteristics. For best results, multiple speakers should be separated by at least fifteen or twenty feet, and different tremulant speeds for each speaker (by belt adjustment) can be chosen so as to get the intermingling tremolo effects so characteristic of large pipe organs. Sound output from each speaker should be balanced by means of the volume control in the amplifier so that listeners will hear some sound from each cabinet.

If two speakers are connected to a console and placed adjacent to each other, they must be phased so that the pedal frequencies will add instead of subtract. This can be accomplished by reversing the signal leads at either of the speakers. Connect these wires for loudest pedal output.

When connecting more than two Leslie-Vibratones to a single console, a separate 110v AC supply should be used for the additional speakers so as to avoid overtaxing the console switch and cable. The method of connecting additional speakers is as follows: six-wire jumper cables with regular six-prong plugs and sockets should be made to interconnect the additional speakers; when the six-prong socket is attached to the cable, do not connect the AC wires to pins No. three and four, but attach these to the coil of a 110v AC relay; connect a separate pair to these pins No. three and four, and break one side of this line with the relay contacts. Connect this line to a separate 110v outlet.

In this manner, the extra speakers are automatically turned on and off when the console is turned on and off without the power load running through the console circuits. Be sure the other four wires of the six-prong plug and socket are connected to their proper terminals. If this is done, the remote control switch at the console will operate the relays in all of the Vibratones, and will control the tremolo in all of the speakers without any special connections. Tremolo control relays should be adjusted in each speaker separately, after the installation wiring is completed.

SHIPPING INFORMATION

The Leslie-Vibratone may be made ready for average shipping or hauling by merely securing the upper motor in shipping position. This is done by fastening motor with shipping clip provided. Apparatus in lower compartment does not require any shipping preparation.

If cabinet is to be subjected to rough handling, such as freight, etc., it is best to make further shipping preparations as follows:

1. Remove tubes and pack separately.

2. Wedge a board or other material under front edge of amplifier to prevent vibration during shipment.

NOTE: While cabinet may be carried in a horizontal position (with upper motor clamped in shipping position), the cabinet should always be shipped in an UPRIGHT position.

Belts

Replace upper belt by slipping it over first one horn and then the other, then place it in pulley grooves. THE HORN ASSEMBLY NEED NOT BE REMOVED FOR THIS OPERATION.

Replace lower belt by merely removing lower back cover and placing belt on the two pulleys. When installing a new belt, belt tension may be adjusted by loosening the wing nut. DO NOT APPLY TOO MUCH TENSION TO LOWER BELT. Do not attempt to stretch belt tight.

Amplifier

Amplifier may be removed as follows:

1. Remove all plugs along side and front.
2. Remove the two screws securing amplifier mounting to shelf.
3. Lift end of amplifier and withdraw from cabinet. Amplifier is replaced in exactly the reverse manner with end of amplifier held up while it is skidded into position against its mounting receptacle at front of cabinet.

A five ampere fuse conveniently located on top of amplifier protects against short circuits, etc. Amplifier may be operated for test purposes out of cabinet by using three extension cables. Motor plugs and switch plug may be left disconnected.

A 130 volt line voltage tap is provided on the power transformer, and should be used wherever the line voltage is usually 125 to 135 volts (see diagram).

Normal voltages using 1000 ohms per volt voltmeter are indicated on schematic diagram. (Allow for differences due to line voltage fluctuations.)

Badly mismatched 6L6 tubes may cause hum and should be switched around or replaced so that this difficulty will be eliminated.

If the output transformer is replaced, the two plate leads must be as short as possible, lie against the chassis, and run directly to tube terminals, for excessive lead length will cause high frequency oscillation which will be noticeable as amplifier distortion.

Amplifier gain is purposely greater than necessary so that full power may be obtained from consoles with weak output. Normal position for gain control is usually about four decibels less than maximum.

Dividing Network

A frequency dividing network, consisting of coils and condensers, separates the organ output so that only high frequencies reach the treble speaker, and low frequencies reach the bass speaker. This filter network is located in the center compartment and is connected to amplifier and speakers by means of the cable and five-prong plug.

Oiling

MOTORS: Upper and lower motors should be oiled about every four to six months for average use. If speaker is used constantly on a commercial basis, motors should be oiled about every two months. To oil motors, place a few drops in upper oil hole and in oil tube of each motor. Organ generator oil or sewing machine oil is satisfactory for this purpose.

CAUTION: DO NOT OVER-OIL MOTORS. A FEW DROPS AT EACH POINT ARE SUFFICIENT.

UPPER TREMULANT ROTOR: Push copper-plated locking lever to one side and remove rotor by lifting straight up. Place a few drops of oil on bronze oilite bearing. Rotate horn in a vertical position so that oil will cover surface of bearing. Allow to soak in for a few minutes, wipe off excess oil, and replace rotor. DO NOT OVER-OIL THIS BEARING AS EXCESS OIL MAY RUN INTO SPEAKER UNIT AND CAUSE DAMAGE. A few drops of oil every year is sufficient except in severe use, when oiling is recommended every six months. Under no circumstances should grease be used on the bronze oilite bearing as this will destroy the oil absorbing properties of the bearing material. Lower tremulant rotor is mounted on precision ball bearings that do not require further lubrication.

Miscellaneous

The Leslie-Vibratone cabinet should rest firmly on the floor. It is not necessary that cabinet be absolutely level, but wedges should be placed under corner of cabinet that does not touch floor.

Due to the improved tonal characteristics of the Leslie-Vibratone speaker, it is usually advisable to reset tone control in console for the most pleasing blend of tone.

In comparing depth of bass output with different consoles, some consoles do not have fundamental tones in the lowest pedal range, which may give the impression that the Leslie-Vibratone lacks bass.

When connecting other cabinets along with a Leslie-Vibratone, the console cable should be run directly to the Leslie, with the other cabinet or cabinets being connected by means of jumper cables from the Leslie. This allows the remote control tremolo circuit to be complete, and it will not operate if the Leslie-Vibratone is connected to another make tone cabinet instead of to console directly.

Only one of the horns in the upper rotor assembly radiates sound. The other horn is for the purpose of dynamically balancing the assembly to eliminate vibration. A small cotton filter is placed in the throat of the horn for acoustic reasons, and it also prevents dust from entering the driver unit. Do not remove cotton filter.

The Leslie-Vibratone is ordinarily equipped for sixty cycle power line operation. For fifty cycle operation, change both upper and lower motor pulleys to the larger fifty cycle diameters. (Parts Nos. 205A and 116A.)

To remove high frequency speaker:

1. Remove upper belt.

2. Move copper-plated lever to one side so that it disengages groove in pully hub, and remove rotor assembly by lifting straight up.

3. Loosen front and back clamps and swing to one side, remove four-prong plug in amplifier and motor ground wire. The high frequency unit may then be lifted up and out of cabinet.

Rotor spindle and mounting plate may be removed from high frequency speaker by removing three 6/32 screws that hold it in place.

The die-cast plate can be removed from driver unit by removing the four slotted head screws. Do not remove the two Phillips head screws which hold driver unit together, as these control diaphragm alignment and must be assembled with jigs.

To remove upper motor:

1. Remove pulley.

2. Remove three screws in center of rubber grommets.

CAUTION: Use only mounting screws supplied, or other screws of this exact length, so as to avoid damage to the motor windings.

To remove bass speaker:

1. Remove heavy bass reflex chamber back from center compartment of cabinet by means of ten wood screws, one of which will be found securing lower shelf to bottom of back.

2. Bass speaker may then be removed by taking out mounting screws in rim and removing speaker plug.

To remove bass rotor:

1. Remove bass speaker.

2. Place cabinet face down on carpet or blanket.

3. Remove screws in ends of shaft. If shaft turns, hold with pliers, reaching through top openings of rotor.

4. Loosen setscrew in rotor pulley and remove pulley and belt.

5. Remove lower metal crossbar support, and rotor may then be taken out of cabinet. Before removing crossbar, outline the edges with pencil where they contact the cabinet sides, as this will assist in aligning the screw holes when reassembling.

Special seal washers are provided adjacent to each bearing, and when reassembling be sure that face of washer with small step machined in it is adjacent to bearing to provide rotary clearance.
To remove bass rotor bearings:

Upper Bearing: Remove bass speaker. Loosen bearing clamp screw and push clamp down against rubber mountings while pushing rotor shaft up. Repeat several times, and bearing may be worked out of clamp.
Lower Bearing: Lay cabinet face down. Remove six inch pulley. Loosen bearing clamp screw, and bearing may be worked out by pushing on bearing clamp several times.

To remove lower motor:

1. Remove pulley.

2. Remove three screws in center of the rubber grommets.

CAUTION: Use only mounting screws supplied, or other screws of this exact length, so as to avoid damage to motor windings.
The lower motor is equipped with thrust bearings, therefore an upper motor cannot be substituted.

LESLIE-VIBRATONE ACCESSORIES

For specialized operation, the Leslie Electric Brake and the Leslie Echo Control are available. The electric brake provides quick stopping of the lower tremulant rotor. The echo control provides complete output control of dual speaker installations. For further information catalog sheets may be obtained from your dealer.

Installation instructions on both of these items are included in the booklet for handy reference.

INSTRUCTIONS FOR INSTALLING THE LESLIE ELECTRIC BRAKE MODEL H

1. Mount the electric brake case on the upper shelf in front of the treble speaker mounting stand with wood screws provided. Position brake case with cords toward amplifier. NOTE: For broadcasting or recording, the slight mechanical click from relay operation may be eliminated by mounting the brake inside the bass reflex chamber. Mount in an inverted position near the cable notch in the shelf.

2. Remove lower motor cord from amplifier chassis, and plug into socket on top of brake chassis.

3. Insert two-prong plug from brake into desired motor outlet in amplifier chassis. If lower rotor is to be controlled from console along with upper rotor, use a three-way outlet in motor socket identified with red dot; if lower rotor is to be controlled from the cabinet switch, use socket that is unmarked.

4. Insert six-prong plug into extra speaker socket in end of amplifier. A socket is built into this plug so as not to disturb the use of the extra speaker socket in the event the installation includes more than one speaker.

Upon checking operation of the electric brake, the lower tremulant rotor should stop in approximately five seconds. If a longer time is required, the

belt tension is probably not tight enough to prevent motor pulley slippage. Re-adjustment of the lower belt with just enough tension to prevent slippage is recommended when installing the electric brake.

When testing operation of the brake, do not turn the tremulant switch on and off rapidly. While this will do no harm, it may lead to the impression that the brake is not operating since the thermal relay requires a few seconds to re-cycle. Once the brake is operated and the tremulant turned back on, a period of about seven to ten seconds must be allowed before the brake is ready to operate again.

Do not operate both motors from the electric brake socket as this may cause damage to the brake equipment. Since the upper rotor stops in a couple of seconds, there is no advantage in using the electric brake with the upper motor.

INSTRUCTIONS FOR INSTALLING LESLIE ECHO CONTROL TYPE 3H

1. Attach control case along keyboard rail at desired position. Use screws provided and be sure metal washers are under heads to prevent breakage of the plastic case mounting lugs.

2. Mount terminal box inside generator compartment near pre-amplifier. Cut small notch in shelf to allow entry of cable. Secure the cable underneath console shelf with insulated staples supplied.

3. Disconnect cable wires at "G-G" terminals on pre-amplifier and connect to screw terminals on echo control terminal box marked "Main".

4. Connect the red and black wires from the terminal box to the pre-amplifier terminals marked "G-G".

5. Make up desired length of six-conductor echo speaker cable with spade soldering lugs on one end and six-contact socket on other. The gray and blue wires are heavier gauge, and it is important that they be used for the power supply. The various wires in the cable should be used for the following circuits:

Gray and blue	- 115 volt A.C.
Red and black	signal line
Yellow	ground
Brown	B+ (if used)

The echo cable may be brought into the generator compartment along with the main cable through the pedal switch compartment and metal tube, or a notch can be cut in the shelf so that the cable enters the generator compartment directly.

6. Connect the six-conductor echo cable as follows: gray and blue wires to 115 volt terminals in pre-amplifier; yellow wire to ground terminal on pre-amplifier; red and black wires to "Echo" terminals on echo control terminal box.

7. In the event a Leslie-Vibratone equipped with remote tremolo switch is the echo speaker, install the tremolo switch and filter box in the usual manner except connect red wire from the filter box to brown wire of echo cable. The yellow wire from the tremolo filter box should be insulated with tape and left disconnected.

8. If two Leslie-Vibratones are used, one for main and one for echo, both tremolo switches should be installed for maximum control. The remote tremolo switch for the main cabinet is installed and adjusted in the usual manner; however, the remote tremolo switch for the echo cabinet should be installed as per above (Paragraph 7).

9. When using a Leslie-Vibratone and Hammond cabinet as main and echo speakers, the Leslie should be used on the "Main" switch position so that the remote tremolo switch will operate with a minimum of wiring.

10. If a Hammond cabinet is used for the echo speaker, it is not essential to connect the B+ (brown) wire in the echo cable at either end, and it is suggested that this wire be cut short and left disconnected to prevent unnecessary voltage in the cable.

PARTS LIST for LESLIE-VIBRATONE ORGAN SPEAKER

MODEL 31H

High Frequency Mechanical Parts—Upper Compartment

Part No.	Description of Part	List Price*
100	Plastic horn only (with reflectors)	$ 12.00
101	Treble rotor complete with pulley (less spindle)	19.30
102	Rotor spindle and mounting plate	3.30
201	Plastic horn reflectors (2 used)	.30 ea.
202	Reflector mounting pins (6 used)	.03 ea.
203	Jensen Driver unit, Model V21	32.50
104	Woven belt for treble rotor	1.25
205	Three-step motor pulley—60 cycle	1.35
205A	Three-step motor pulley—50 cycle	1.60
206	Driving motor, less mounting	13.50
207	Motor mounting assembly only	3.00

Low Frequency Mechanical Parts—Lower Compartment

109	Bearing clamp (2 used)	1.40 ea.
110	Ball bearing (S K F No. 6200) 2 used	1.05 ea.
111	Upper bearing support	1.60
112	Lower bearing support	2.60
113	Bass tremulant rotor	21.00
214	Driving motor less mounting	14.00
115	Motor mounting assembly only	3.25
116	Single groove motor pulley, 60 cycle	1.30
116A	Single groove motor pulley, 50 cycle	1.60
117	Woven belt for bass rotor	1.50
118	6" rotor pulley	1.45
119	Upper bearing seal washer	.25
120	Lower bearing seal washer	.25
121	Cloth rotor cover only	1.40
222	Bass speaker unit	63.50
222A	Bass cone and voice coil for replacement	8.00

Amplifier Parts

123	Power transformer	22.00
124	Filter choke	8.50
125	Output transformer	13.50
126	Relay	4.90
127	Dividing network complete	17.50
228	Remote control switch kit (consists of switch, switch case, & filter box, state color)	9.50
250	Plastic switch case only, brown	1.90

251	Plastic switch case only, ivory	2.25	
252	Plastic switch case only, black	2.25	
253	Switch knob only, state black or brown	.10	

Miscellaneous Parts

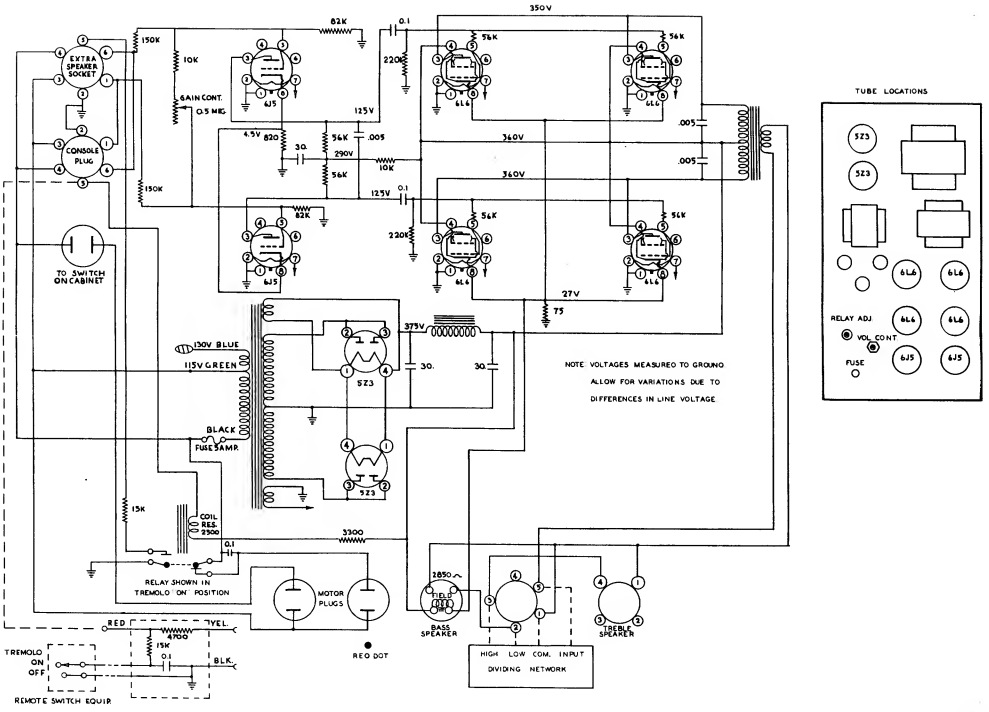
260	Upper back cover	2.25	
130	Lower back cover	2.50	
131	Amplifier rubber mounting bushings (4 used)	.03	ea.
132	Grooved rubber grommets (gum rubber, 14 used)	.03	ea.
133	Grooved rubber grommets (black, oil-resistant rubber, 7 used)	.03	ea.
134	Motor mounting stepped rubber bushings (4 used)	.03	ea.
134	Treble speaker hold-down bushings (2 used)	.03	ea.
135	Treble speaker rubber mounting pads (3 used)	.04	ea.
136	Bass rotor shaft grommet (center, narrow groove)	.05	
137	Bass rotor shaft grommets (ends, wide groove, 2 used)	.05	ea.

Accessories

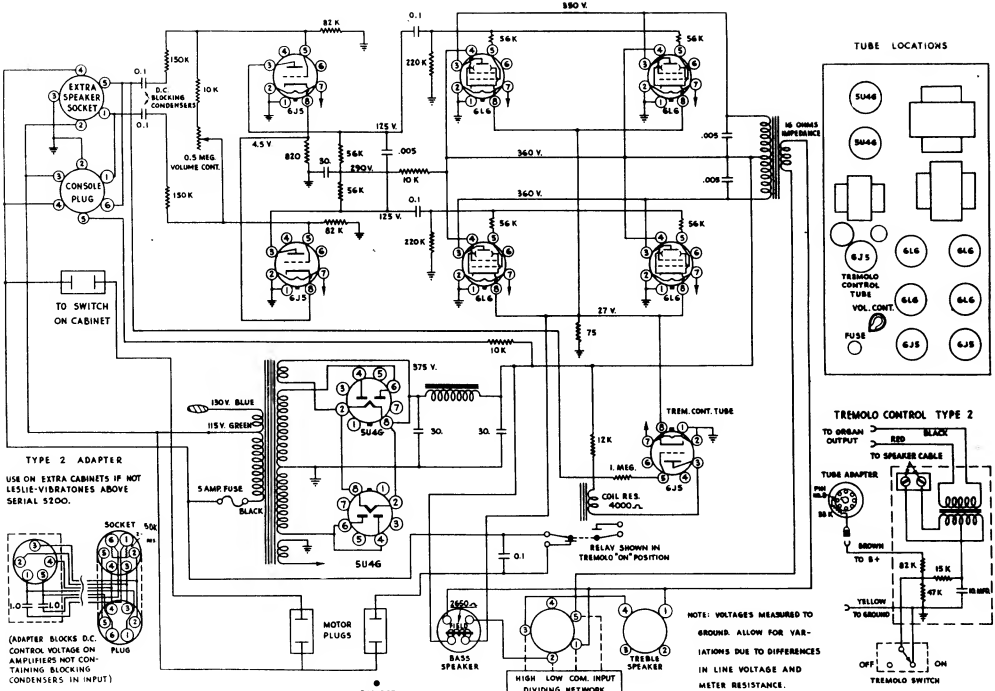
Leslie Electric Brake, Model H	16.00	
Leslie Echo Control Type 3H	16.00	
Six-conductor cable, brown rubber covered	per ft.	.25
Six-contact plug and socket with caps	per set	.75

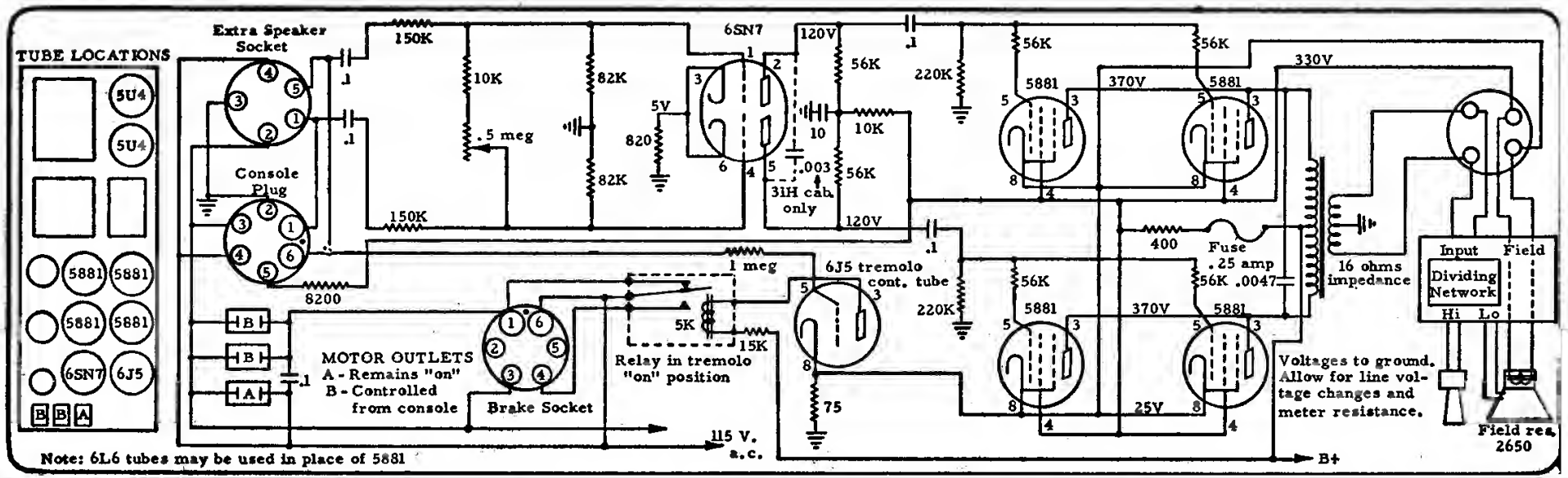
*Prices subject to change without notice.

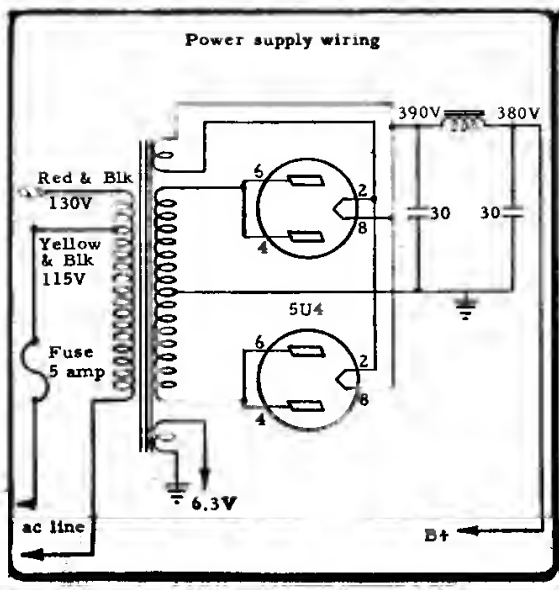
LESLIE-VIBRATON MODEL 31H

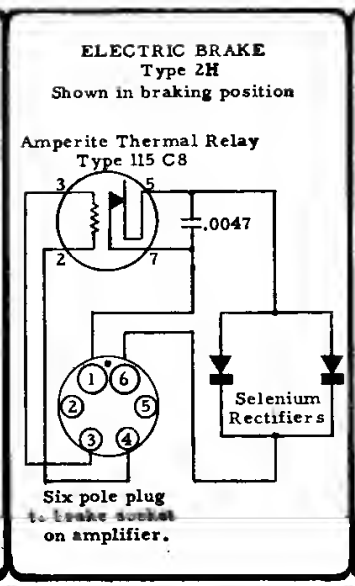


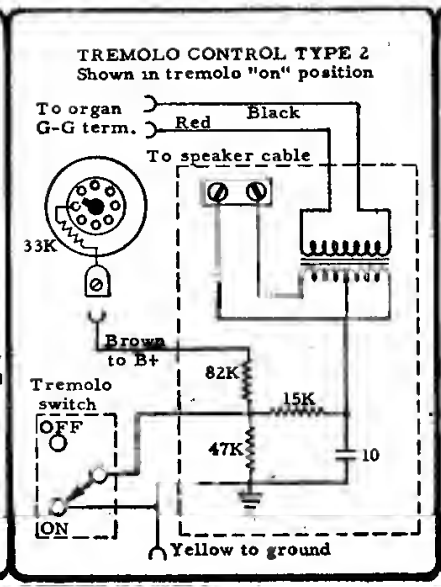
LESLIE AMPLIFIER MODEL 31H TYPE 2

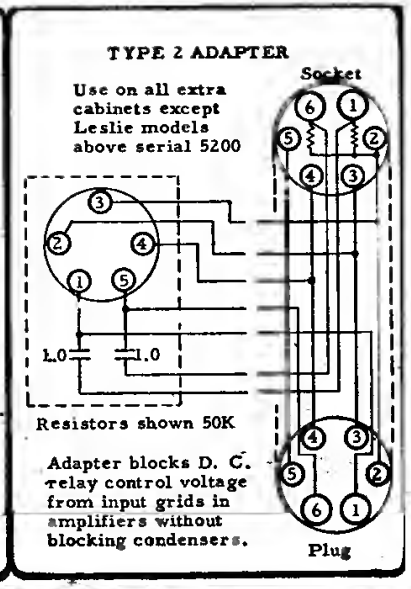












MODEL [illegible]

SPECIFICATIONS

CABINET: [illegible] Walnut. [illegible] 30" deep, 46" high.

TREMOLO CONTROL: [illegible]

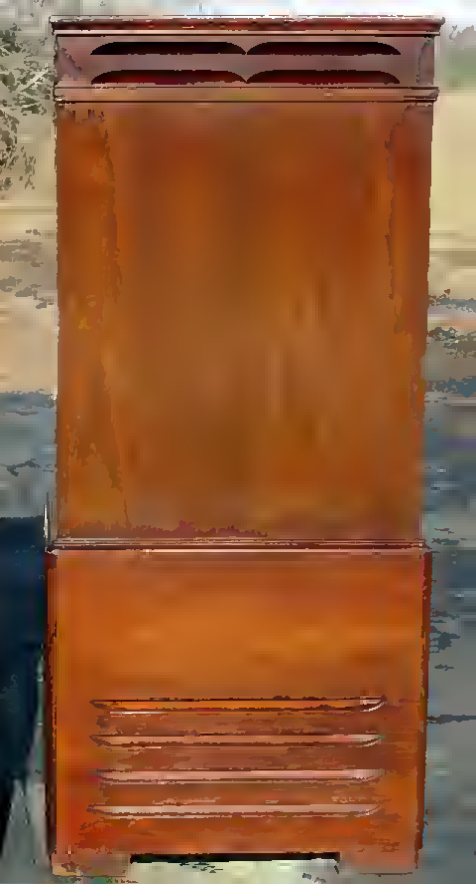
AMPLIFIER: [illegible]

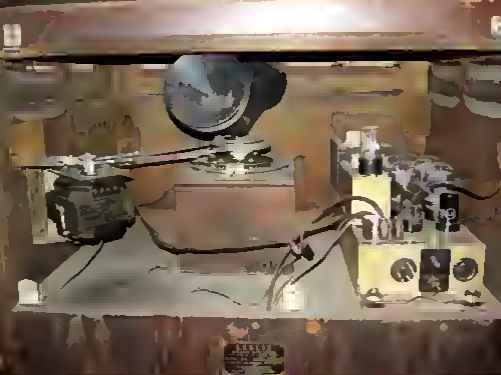
POWER SUPPLY: [illegible]

WEIGHT: Net. Approximately [illegible]

GUARANTEE: [illegible]

Console Tremolo Control





GENERAL INSTRUCTIONS LESLIE MODEL 31H

(Above Serial No. 8000 Equipped with 32H Series 3 Amplifier)

COMPARTMENT COVERS

compartment covers, remove the two screws along and pull cover

INSTALLATION

TREMOLO CONTROL.

the remote control equipment furnished with this the control terminal box.
this operation

ring to method.

RUN INTO SPEAKER

few drops of a severe
oiling is recommended every

LOWER TREMULANT ROTOR.

This rotor operates on specially sealed ball bearings and does not require additional lubrication.

BELT REPLACEMENT